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ABSTRACT

This paper examines whether the Maine School of Science and Mathematics, a magnet school in its second year of operation, has improved equity of opportunities for Maine students to participate in advanced mathematics and science courses. Data on per pupil expenditures, state aid to school districts, and course offerings were obtained from the state department of education and from a survey of 118 Maine high schools (92 percent of public secondary schools). Data indicate that while some of Maine's smallest high schools are represented in the magnet school's student body, a majority of the students come from larger high schools. Only 31 percent of the smallest schools (less than 151 students) are represented at the magnet school, compared to 71 percent of the largest schools (more than 750 students). About 27 percent of the 74 school districts represented at the magnet school are in Maine's four most rural counties, while about one third are from Maine's four most populated counties. The 74 school districts' expenditures per secondary student ranged from $2,800 to $5,800, with one third spending more than the state average. About half of the districts offered no advanced mathematics courses, and about half offered no advanced science courses. This report concludes that the magnet school has increased equity of opportunity for all of Maine's secondary students. Includes data tables detailing representation at the magnet school by school size, county, and district financial characteristics. (SV)

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The Impact of the Maine Magnet School on Improving Equity of Academic Opportunities: Early Results

(Revised 12/96)

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ABSTRACT

The Impact of the Maine Magnet School on Improving Equity of Academic Opportunities

Early Results

The Maine School of Science and Mathematics is now in its second year of operation. One key public policy question is: Has the magnet school improved equity of opportunities for Maine students to participate in challenging advanced mathematics and science courses? This study attempted to answer this question by analyzing information about the district of residence of the first- and second-year students enrolled in the magnet school. The evidence indicates that many of the students enrolled in the magnet school come from small, rural high schools in resource- and program-poorer school districts. The data also reveals that many of the students come from wealthier, more urban districts. Accordingly, the evidence reported here suggests that the creation of the magnet school has improved the opportunities for some students from small, rural high schools in resource- and program-poorer districts. At the same time it has enhanced the opportunities for other students from more prosperous school districts. Thus, one may conclude that the magnet school has increased equity of opportunity for all of Maine's secondary students.

The Impact of the Maine Magnet School on Improving Equity of Academic Opportunities
Early Results

David L. Silvernail University of Southern Maine

INTRODUCTION

The Maine School of Science and Mathematics is now in its second year of operation, and many policymakers, educators, and citizens alike are eager to learn about the impact of Maine's first and only magnet secondary school. Many indicators will be useful in assessing the impact of the school, some which are available now and others which will only be available over time. From a public policy perspective, one key question is: Has the magnet school improved equity of opportunities for Maine students to participate in challenging advanced mathematics and science courses?

Although most of Maine is rural and sparsely populated, there are considerable differences between school districts. According to Maine State Board of Education information (1995), approximately 25% of Maine's high schools enroll 300 or fewer students while an equal percent enroll over 700 students. In 1994-95, the smallest high school enrolled 28 students and the largest enrolled 1340 students. The percentage of state aid distributed to school districts ranges from under 5% to a high of over 95%, and in 1994-95, district per pupil operating costs ranged from a high of over $9500 to a low of under $4000 (Maine Department of Education, 1995). And a survey completed by the Maine Education Policy Research Institute (1996) revealed that some schools offer a full array of mathematics and science courses, including several advanced level courses, while others offer a limited number of courses and few if any advanced level courses.

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What impact has the new magnet school had on this disparity between schools? Has it been an effective tool in improving equity of academic opportunities for Maine secondary students, some of whom reside in resource- and program-poorer school districts? This study attempted to answer this question by analyzing information about the district of residence of the first- and second-year students enrolled in the Maine School of Science and Mathematics. More specifically, the study attempted to answer the following questions:

1. Are most of the magnet school students from small, rural school districts?
2. Are most students from districts with lower per pupil expenditures and higher levels of state aid?
3. Are most students from districts offering few, if any, advanced mathematics and science courses?

Some of the information used in this analysis was data compiled by the Maine Education Policy Research Institute, a collaborative institute of the Maine State Legislature and the University of Maine System. Information about course offerings was taken from surveys completed in 1995-96 by high school principals. Useable surveys were received from 118 high schools, a number that represents approximately 92% of Maine public secondary schools. Data on per pupil costs and state aid was compiled from information school districts submit annually to the Maine Department of Education.

RESULTS

Are most of the magnet school students from small, rural schools?

Tables 1 and 2 provide information for answering this question. Table 1 reports the number of Maine high schools by varying size (for which course offering data is available), and the number and percentage of these different size schools that are represented in the student body

of the magnet school. The data indicates that while some of Maine's smallest high schools are represented in the student body, a majority of the students are from larger high schools. For example, only 31% (5 of 16) of the smallest schools (less than 151 students) are represented in

Table 1

HIGH SCHOOL SIZE

Number of Students in High School	Number of Maine High Schools	Number of High Schools Represented in Magnet-School Student Body	Percentage Represented in Magnet-School Student Body
Less than 50	2	0	0%
51-150	14	5	36%
151-300	23	15	65%
301-450	26	17	65%
451-600	21	11	52%
601-750	12	10	83%
751-900	10	8	80%
More than 900	11	7	64%

the student body, while 71% (15 of 21) of the largest schools (greater than 751 students) have representation. And of the 74 different school districts represented in the first two classes enrolled at the magnet school, approximately one-third (n=25) are from Maine's high schools that enroll 601 or more students.

Table 2 reports the distribution by county of school districts represented at the magnet school. Analysis of this data reveals that approximately 27% of the 74 (n=20) different districts represented at the magnet school are in four of the most sparsely populated counties (Aroostook, Franklin, Piscataquis, and Washington). On the other hand, approximately one third (n=27) of the

districts represented are from four of the most populous counties (Androscoggin, Cumberland, Sagadahoc, and York).

To summarize the findings with regard to the first question then, the evidence suggests that some students from small school districts in rural counties are enrolling in the mathematics and science magnet school. However, the evidence also shows that a large number of the school districts represented in the magnet school student body have some of the largest high schools in the state and many of these are located in the most populated counties.

Table 2

COUNTY REPRESENTATION

County	Persons per Square Mile (1990 census)	Number of Maine High Schools	Number of High Schools Represented in Magnet-School Student Body	Percentage Represented in Magnet-School Student Body
Androscoggin	217	8	4	50%
Aroostook	28	15	11	73%
Cumberland	404	15	12	80%
Franklin	30	4	0	0%
Hancock	54	5	5	100%
Kennebec	154	10	6	60%
Knox	130	3	2	66%
Lincoln	89	4	2	50%
Oxford	34	4	3	75%
Penobscot	85	14	8	57%
Piscataquis	25	4	1	25%
Sagadahoc	181	3	1	33%
Somerset	39	7	4	57%
Waldo	41	4	9	0%
Washington	57	10	8	80%
York	158	9	7	78%

Are most students enrolled in the magnet school from districts with lower per pupil expenditures and higher levels of state aid?

Average expenditures per secondary student in 1993-94, and the average percent of state aid to districts are reported in Table 3. The state average was approximately $3578 per pupil, and the average state aid was approximately 60%. The table also reports per pupil expenditures and state aid for districts that have students enrolled in the magnet school and those not represented in the magnet school. In the case of per pupil expenditures, the median for the schools represented in the magnet school population is within $100 of the state average. But, this median is approximately $575 less than the average secondary per pupil expenditures for districts which have no student enrolled in the magnet schools. Turning to state aid, the represented schools receive a higher percentage of state aid. It was approximately 6% higher than the state average and 15% higher than the non-represented schools.

Table 3

FINANCIAL CHARACTERISTICS

Schools	N	1993-94 Median per Secondary Pupil Expenditure	1993-94 Median Percentage of State Aid
All secondary schools/districts	118	$3578.20	60.2%
Secondary schools represented in magnet school	74	$3486.20	66.2%
Secondary schools **NOT** represented in magnet school	44	$4063.00	51.2%

This data suggests that many students enrolling in the magnet school are coming from some of Maine's poorer districts, relatively speaking. However, further analysis indicates considerable

differences in district wealth within the 74 schools represented in the magnet school. The range in per secondary pupil expenditures within the 74 districts is approximately $2800 to $5800 with 1 in 3 districts spending more than the state average. And for state aid, the range within the 74 districts is from about 4% to 88% with 1 in 3 districts receiving less than one-third of their school funding from state aid. Thus, the answer to the second question is similar to the answer to the first question. That is to say, while many students enrolling in the magnet school are coming from less wealthy school districts, many also are coming from more wealthy districts.

Are most students enrolled in the magnet school from districts offering few, if any, advanced mathematics and science courses?

Table 4 summarizes some of the course information principals reported on surveys for the 1995-96 school year. As indicated in the table, approximately one half (46%) of the districts

Table 4

ADVANCED MATHEMATICS AND SCIENCE COURSE OFFERINGS

Course Offerings	Percentage of Districts Represented at Magnet School	Percentage of Districts Enrolling No Students in Magnet School
Percentage of districts offering **no** advanced **mathematics** courses	46%	55%
Percentage of districts offering **AP Calculus**	54%	45%
Percentage of districts offering **no** advanced **science** courses	51%	56%
Percentage of districts offering 1-3 AP science courses or some other advanced science courses	49%	44%

represented in the magnet school student body do not offer advanced mathematics courses. A similar percentage (51%) offer no advanced science courses. And further analysis indicates that approximately one third offer **neither** advanced mathematics nor science courses.

Interestingly, this pattern is even more pronounced for those districts not having students enrolled in the magnet school. More than one half (55%) offer no advanced mathematics courses and 56% offer no advanced science courses. And 36% offer **neither** advanced mathematics nor science courses. Thus, it does not appear that a clear majority of the students attending the magnet school come from districts offering few, if any, advanced mathematics and science courses. About one half of the student body does come from these districts, but an equal number come from districts offering advanced courses.

CONCLUSION

In conclusion, the information compiled to answer the three research questions in this study indicates that many of the students enrolled in the magnet school come from small, rural high schools in resource- and program-poorer school districts. However, the data also reveals that many of the students come from wealthier, more urban districts. Thus, the broader question remains: has the creation of the magnet school been an effective tool in improving equity of academic opportunities for Maine high school students?

According to Webster's dictionary, *equity* is defined as "anything that is fair or just." Given this definition, one may argue that *equity* of opportunities has, in fact, improved. All Maine high school students are being treated fairly and justly. All have an equal opportunity to enroll in the magnet school and all are given an opportunity to gain more advanced mathematics and science courses. For some students this means access to advanced courses for the first time, and for others it means access to more advanced courses. Rawls (1971) describes an appropriate redress for

inequalities as one in which "Those who have been favored by nature, whoever they are, may gain from their own good fortune only in terms that improve the situation of those who have lost out (p.100)." The evidence reported here suggests that the creation of the magnet school has improved the opportunities of the disadvantaged while at the same time allowed other students to gain from their own good fortune of living in wealthier school districts. Thus, one may conclude that the magnet school has improved equity for all Maine's secondary students.

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